I William G Radicic, amateur radio call sign NS0A, Extra class, license - endorse the position of the Members of this Board of Directors who unanimously are in support of the Commission's proposal and encourage the elimination of the outdated and symbol rate limits. Opponents to WD Docket No. 16-239 have responded to internet and social media campaigns led by Theodore Rappaport, resulting in a multitude of comments that echo false or misleading technical points, driven by highly emotional arguments about "national security, crime and terrorism". We address these arguments with the documented realities of science and logic in hopes that the Commission will find them balanced, informed, and trustworthy counterpoints for good decision making.

The HF Symbol Rate Limitation in § 97.307(3) Should be Removed The current 300 baud symbol rate limitation was instituted around 1980 by the Commission as a mechanism to manage HF digital modes (both FEC and ARQ) that would be compatible with typical HF signal widths in use. The most common amateur HF digital modes in use then were AMTOR (similar to SITOR), later refined as Pactor 1 and HF packet (300 baud FSK). Since then, technical advancements in modulation, coding technology and Digital Signal Processing (DSP) now make it possible to implement significantly faster, more robust digital protocols with better spectrum efficiency (e.g. PSK31/63, MT63, Pactor 2, Pactor 3, WINMOR, ARDOP, VARA, Pactor 4, and other popular amateur modes). These modes are possible and affordable due primarily to the significant advancements in digital signal processing, cost reductions in computers, sound cards, and DSP processing chips since the original 300 baud symbol rate restriction was instituted. So, in 2018, the symbol rate limit is a deterrent to advancing the radio art now that modern encoding techniques are available.

A more appropriate mechanism for managing these amateur modes would be to use a specific and more relevant metric such as occupied bandwidth. The Commission has used this approach in some of the emission types in § 97.303 and § 97.221. Adopting this approach has several advantages: Promotes advancement of the radio art The Commission's rules define the purposes of the Amateur Radio service. One of them is to advance the radio art.

The current limitation has set the US well behind other countries in the development of more efficient HF radio protocols. Now there is little incentive to develop better protocols. Improved coding theory, DSP hardware and software now allow more efficient spectrum utilization, but the current rules minimize incentives to bring them into existence. The fact is, better, more efficient HF modems are possible while keeping signal widths manageable in other ways than limiting symbol rate. The Increase of spectrum efficiency (bytes/minute/Hz) More data sent in less time in the same occupied bandwidth allows more stations to use the same occupied spectrum in time (higher bytes/minute/Hz). This reduces band congestion. Higher symbol rates in advanced ARQ modes that adapt to a rapidly changing propagation channel allow this. Examples: —Pactor 4 (not permitted because it exceeds 300 baud) has over twice the spectrum efficiency as Pactor 3 (which conforms to the 300 baud restriction) while occupying slightly less than the same bandwidth.

Mil STD 188 110B and similar STANAG modes provide an efficient mechanism for transmitting up to 6400 bits/sec in a 2600 Hz bandwidth using a single 2400 baud carrier with 16QAM modulation. This detailed and publicly documented protocol, with its optional encryption layer disabled for amateur use, would provide another effective, efficient and proven protocol for amateur use that would ease band congestion, not worsen it.

We need to intercommunicate more efficiently with countries that already permit digital protocols without symbol rate restrictions. Canada, Mexico and Central America and most of the world already fill our airspace with signals using modern modes not permitted in the US—with no more signal width than Pactor 3 and with double the spectral efficiency. The International Telecommunications Union (ITU) has undertaken a project to expand Pactor 4 Winlink gateway stations in Guatemala, Costa Rica, Dominican Republic, and Nicaragua to bring superior contingency communications to the region.

Affective disaster areas would depend upon US resources in large disasters and interoperable, efficient communications means are needed. And the reverse is also true. Interoperability is certainly key in either direction. Remove the need for Special Temporary Authority (STA) during major events. Following recent hurricanes, the FCC saw the need for Pactor 4 and granted STAs for each occurrence as it was needed.

There are no other competing digital systems with Winlink's scale of use and real, demonstrated results, ranging from hurricanes to the recent California wildfires. Whatever the emergency, today's needs dictate being able to quickly send large volumes of data without error. Efficient protocols being available full time is more effective than temporary STAs. With the permanent elimination of the symbol rate restriction, individuals will be inclined to make the investment in protocols like Pactor 4, and equipment will be set up and tested in advance of need. Expensive and Mil-grade modems are difficult to justify for only short-term use.

Respectively,
William G Radicic